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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,350	10/19/2001	Michael Franks Robinson	0892161.000000US	1373

7590 06/17/2003

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EXAMINER
ANDERSON, MATTHEW A

ART UNIT	PAPER NUMBER
1765	

DATE MAILED: 06/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/019,350	Applicant(s) ROBINSON, MICHAEL FRANKS
	Examiner Matthew A. Anderson	Art Unit 1765

-- The MAILING DATE of this communication appears n the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 October 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 10/19/2001 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 6, 8-10, 12-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishizumi (JP-0-683249 A).

Ishizumi et al. discloses a method and apparatus for vapor growth. The method is described in the abstract as capable of growing a compound semiconductor layer having an evenness and an interfacial sharpness in units of atomic layers with a good productivity. Thus a method is commonly known in the art as a atomic layer epitaxy

(ALE) or deposition (ALD). (see col. 1 and 2 Description of Prior art.) An example of the apparatus is shown in Fig. 1. Starting in col. 7, Fig. 1 is described. The chamber (1) has a cylindrical portion (1b) extending in a vertical direction. Portion (1b) has and upper (1a) and lower (1c) portion. (1a) is the end from which reactants are introduced through pipes (2) and (3). One pipe supplies the cation and the other the anion of the compound semiconductor to be formed. A substrate holder (5) lies in the cylindrical portion (1b) and holds the substrate (4). The example shown in Figs. 2A, 2b, and 2C shows the use of the partition plate (6) as the substrate is rotated from the, in this case, TMG side to the Arsine side. The gases are supplied sequentially to grow the GaAs (a III-V semiconductor) film of the substrate as the raw material gases are decomposed. Figs. 5A-5D show a modification in which hydrogen is used to form the partition of gases within the chamber. Other compound semiconductors ca be grown such as zinc selenide (see Fig. 7), gallium nitride (see Fig. 8), and gallium indium phosphide (Fig. 9). A useable substrate material is given in col. 12 line 15-20 as GaAs. Heat is described as supplied to the substrate by the built-in heater in the substrate holder (5). Temperatures are specific to the material to be deposited and examples in col. 13 include 500'C and 800-1000'C for GaN.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 5, 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizumi et al. as applied to claims 1-4, 6, 8-10, 12-15 above.

Ishizumi et al. is described above.

Ishizumi et al. does not disclose the deposition of SiC.

In respect to claims 5 and 7, it would have been obvious to one of ordinary skill in the art at the time of the present invention to use the method of Ishizumi et al. to deposit the known compound semiconductor SiC because Ishizumi et al. suggest such use for non-specific compound semiconductor deposition. (col. 2 lines 45-50) Motivation would be found in that a broad range of compound semiconductors deposited would expand process flexibility.

6. Claims 11, 16-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishizumi et al. as applied to claims1-10, 12-15 above, and further in view of Oki (JP-58-125698).

Ishizumi et al. is described above.

Ishizumi et al. does not explicitly disclose separate temperatures for the raw materials.

Oki et al. discloses a method and an apparatus in which separate gas streams are used to supply raw material compounds to a reactor used in deposition of a

compound III-V semiconductor. (see abstract) A line supplying one raw material (6) has a separate heating element (7) within it. Fig. 3 shows an electrically activated (i.e. a wire) heater. The other raw material is supplied to the reactor separately. A heating RF coil (3) heats the substrate (4) within the chamber.

It would have been obvious to one of ordinary skill in the art at the time of the present invention to combine the Oki and Ishizumi et al. disclosures because then the temperatures at which the raw materials were decomposed could be more easily controlled as suggested by Oki et al. (see page 3 of the translation, 1st full para.).

In respect to claim 11, it would have been obvious to one of ordinary skill in the art at the time of the present invention to optimize the temperature of the substrate because temperature was known to effect the deposition process and two temperatures was suggested by Oki et al.

In respect to claims 16, 19, 20, 21, 22, 23, 24, 25, 26, it would have been obvious to one of ordinary skill in the art at the time of the present invention to produce the apparatus thus described with a wire heater in one supply inlet, a heater to heat the substrate, a means for moving the substrate because Oki suggests such as for controlling the temperatures of the raw material gas streams of such deposition systems. The manner in which the apparatus is actually used is not germane to the question of patentability. Only what it is is.

In respect to claim 17, it would have been obvious to one of ordinary skill in the art at the time of the present invention to form the second inlet adjacent to the substrate support because that is were the raw material is directed.

In respect to claim 18, it would have been obvious to one of ordinary skill in the art at the time of the present invention to design a gas inlet including a elongate slot or just a plan hole because the Oki et al. has slots as does Ishizumi et al. where gas is admitted to the chamber and the working of such slots is well within the limits of engineering skill.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew A. Anderson whose telephone number is (703) 308-0086. The examiner can normally be reached on M-Th, 6:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

MAA
June 13, 2003

Matthew Anderson
A.U. 1765